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ABSTRACT

This guide has been developed for use in presenting part "B" of the course of instruction for Support Assistance for Fire Emergencies. It is arranged by class sessions of three hours each. Some of the sessions are divided into two or more sections covering specific subject areas. The intention is to include instruction which will extend the trainees capabilities; make him generally more useful; and qualify him to lead small groups of citizens to suppress small fires stemming from nuclear attack. Each of the eight lesson plans follows the same format: Course Title and Number; Objectives; Instructional Aids; Selected References; Suggested Films; Main Topic; and Teaching Points. (DB)

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IG-9.2B (instructor guide)
July 1971

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Firefighting for Civil Defense Emergencies

# SUPPORT ASSISTANTS FOR FIRE EMERGENCIES

## INSTRUCTOR GUIDE — PART B

AC 610 752

Developed for The Office of Civil Defense
by The International Association of Fire Chiefs

ED054435

# FIREFIGHTING
# For
# CIVIL DEFENSE EMERGENCIES

# SUPPORT ASSISTANTS FOR FIRE EMERGENCIES

## INSTRUCTOR GUIDE-PART B

IG–9.2B–July 1971

Developed for the Office of Civil Defense
by the
International Association of Fire Chiefs
Development Committee

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Review Committee Members and the organizations they represent are:

John Clougherty
Fire Chief, Retired
Boston, Massachusetts

David B. Gratz
Fire Chief
Silver Spring, Maryland

James M. Halloran
Director of Fire and Civil Defense
Kansas City, Missouri

T. A. McGaughey (Deceased)
Fire Chief
Wichita, Kansas

G. A. Mitchell
Fire Chief
Opelika, Alabama

Donald M. O'Brien
General Manager
International Association of Fire Chiefs

Lester R. Schick
Fire Chief, Retired
Davenport, Iowa
Past President, International Association of Fire Chiefs

John Fred Shreve
Consultant
International Association of Fire Chiefs
New York, New York

Gordon Vickery
Fire Chief
Seattle, Washington

Curtis Volkamer
Chief Fire Marshal
Chicago, Illinois

International Association of Fire Chiefs Work Group:

Keith Royer
Supervisor
Fire Service Extension
Iowa State University

Floyd W. Nelson
Chief Instructor
Fire Service Extension
Iowa State University

William E. Clark, Chief
Bureau of Fire Instruction
State of Florida
Ocala, Florida

# INTRODUCTION

## General

This guide has been developed for use in presenting part "B" of the course of instruction for Support Assistance for Fire Emergencies. It is arranged by class sessions of three hours each. Some of the sessions are divided into two or more sections covering specific subject areas. The coverage given each lesson is not exhaustive, but is meant to serve only a basic foundation for the class sessions.

The intention is to include in part "B" instruction which will extend the trainees capabilities, make him generally more useful, and qualify him to lead small groups of citizens to suppress small fires stemming from nuclear attack.

Firefighting terms and practices vary somewhat across the nation. Where there are local or area variation in terms and practices the instructor should bring this to the attention of the students.

It is suggested that, where at all possible, this course be supplemented by further training in radiation detection instruments and fallout, also, by additional training in first aid.

It is further suggested that regular firefighters can profit from instruction in the subject matter covered in the lessons on "The Role of the Fire Service in Civil Defense," "Modern Weapons and Radioactive Fallout," and "Shelter Duties" in both the A and B courses.

## Selection of Instructors

Arrangements should be made to have qualified fire service training officers serve as instructors. Other qualified personnel, such as radiological monitor instructors, can be of assistance in presenting certain lessons. *Personnel selected as instructors should not only be qualified in a particular skill, but should also know how to instruct others.*

## Training Auxiliary Personnel

The quality of training resulting from this course will depend upon (1) the number and caliber of people receiving the training; (2) the ability of the instructor to maintain their interest and enthusiasm; and (3) the support given to the course by local fire officials.

This guide has been designed to serve as a guide to the instructor in a relatively wide range situation. In no instance should this guide serve as a sole source of information for the instructor, nor should it be used, or quoted, as a sole authority in any given subject area.

The instructor should carefully review each lesson plan in this guide to understand its exact objective as well as the source of its material. He should supplement each lesson with appropriate reference materials, and suitable examples appropriate to his particular locality. Local organizational charts, staffing patterns, operational procedures, and forms should be made a part of the lessons. The instructor should be constantly alert for subject matter which may need revision due to advances in firefighting practices, as well as changes in Civil Defense requirements.

At various places throughout the Lesson Plans notes are given in parenthesis for the guidance of the instructor. They should not be used as part of the presentation to the class.

Also, suggested visual and other aids to be used with corresponding lecture materials will be noted under the main topic headings where necessary.

For each section of the Lesson Plans a time period has been suggested. These time periods may vary with the individual instructor, the amount of local information added, and the size of the class where skills development is suggested. No breaks have been specified, but it is suggested that where the sessions are mainly lecture, the students be given a ten minute break each hour.

Students should be given the opportunity to participate in the course as much as possible to enhance their interest. They should be encouraged to ask questions and express ideas. The instructor, however, should be alert and diplomatically cut off the long-winded relating of personal experiences which have little bearing on the subject matter. Class discussions can be very fruitful when they are carefully guided by the instructor.

## Teaching aids and Equipment

Training aids, references, and suggested handout materials are listed in the instructor's guide. The local or state Civil Defense office can provide current Civil Defense publications, and the local fire department may provide the reference sources listed.

A number of large illustrations are included at the back of the instructor's guide. If the instructor has an overhead projector available, he may make transparencies from these illustrations, or he may use them with an opaque projector. Sets of 2 X 2 slides may be available of these same illustrations.

For the sections of the class "Fire Behavior" the instructor should plan to include small table demonstrations. Wherever the lesson includes discussion of fire department tools or equipment, these should be available as teaching aids.

## LESSON PLAN NO. 1

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—PART B
Section I—Introduction.
Section II—Alert and Fire Operations.
Section III—Radioactive fallout.

TIME: 3 hours

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OBJECTIVES:

1. To give the student an understanding of civil defense and fire service operational planning to cope with nuclear fire emergencies.

2. To develop further the ability of the student to use a dosimeter and increase his understanding of protective measures for fallout.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk, and eraser
Overhead, opaque or slide projector
Dosimeters, 1 per trainee, as available:
1. CDV–138. 2. CDV–730. 3. CDV–740 or CDV–742,
CDV–750, Dosimeter Charger, one per 2 trainees, as available.
Survey meters, one per class as available:
1. CDV–700. 2. CDV 710 or CDV–715.
State and local fire operations plans, and listing of local shelters.
Student: Student Manual—*Firefighting for Civil Defense Emergency*—Part A (SAFE A)

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SELECTED REFERENCES:

Instructor's:

*The Effects of Nuclear Weapons*—DA Pam 39–3, 1962, ARC and DOD, Chapter XI, for sale by the Superintendent of Documents, USGPO, Washington, D.C.
*In Time of Emergency*—OCD H–14 March, 1968.
Manufacturers' instruction and maintenance manuals, as appropriate.
*Fire Prevention and Control in CD Emergencies*—Federal CD Guide, Part E, Chapter 10 with Appendices 1 & 2, June 1969.

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SUGGESTED FILM:

"About Fallout," DOD/CD 3–220—24 minutes.

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| MAIN TOPIC | TEACHING POINTS |
|---|---|
| I. SESSION INTRODUCTION—20 min. | A. Welcome to the course Support Assistant for Fire Emergency—Part B<br>1. Relation to "Support Assistant" Part A<br>a. To increase understanding of problems.<br>b. Develop some operational skills.<br>c. Qualify for leadership of small groups of citizens during nuclear emergency.<br>2. Class schedule.<br>a. Time. b. Place.<br><br>B. Purpose of Civil Defense.<br>1. Provide shelter protection.<br>a. Survey.<br>b. Licensing.<br>c. Stocking.<br>2. Issue emergency warnings.<br>a. National warning.<br>b. State system.<br>c. Local system.<br>3. Coordinate Emergency Operations.<br>a. Emergency operating centers.<br>b. Operational planning.<br>4. Establish Emergency Communications.<br>a. Importance of communication.<br>b. Importance of dependability of system.<br>5. Develop Radiological Monitoring Systems.<br>a. For area plotting of fallout.<br>b. For operational personnel.<br><br>C. Objectives of B Course.<br>1. Train personnel to augment and assist fire fighters.<br>a. Shelter fire protertion.<br>b. Suppression of nuclear weapon caused fires.<br>c. Other major disasters.<br>2. Train personnel to instruct other citizens in emergency procedures during periods of increased tension (Cuba).<br>a. Fire prevention.<br>b. Attack warning.<br>c. Fallout protection.<br>d. Fire suppression "Support Assistants".<br>3. Train to supervise small groups of citizens.<br>a. In absence of regular fire fighting personnel.<br>b. Neighborhood fires.<br>c. Shelter fire protection. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| II. ALERT AND FIRE OPERATIONS PLAN—50 min. | |
| Section Introduction | A. This lesson deals with the following:<br>1. Importance of subject matter.<br>2. Emergency standard operating procedure for "Support Assistant" personnel.<br>3. Local fire operations plan. |
| Importance of Subject Matter | B. The "Support Assistant" must know how to conduct and protect himself in case of an alert and what immediate action he should take as a "Support Assistant."<br>C. The "Support Assistant" must have some idea of the local civil defense and fire plans and his probable assignment in case of a nuclear emergency. |
| Emergency Procedures for "Support Assistants" | D. Alert Warning.<br>1. Act as individual citizens unless activated.<br>2. If away from regular address—check on possible activation with planned contact points.<br>E. Attack Warning.<br>1. Report to assigned shelter if feasible.<br>2. Take cover in best available shelter when it is not feasible to go to assigned shelter.<br>3. Report to shelter manager. |
| (demonstrate) | F. No Warning.<br>1. Dive behind best available cover.<br>2. Position.<br>a. Face down.<br>b. Fetal position.<br>c. Cover head with arms.<br>3. After, flash, heat.<br>a. Wait in position for blast.<br>b. Flash travels at speed of light, blast at approximately same speed as sound (about the same relationship as between lightning and thunder).<br>c. Take action as suggested under alert and attack warning. |
| Local Fire Operations Plan | G. Fire Defense Plan.<br>1. State.<br>2. Local Organization.<br>H. Control Points (Emergency Operating Centers).<br>1. Civil Defense.<br>2. Fire Operations.<br>I. Mutual Aid Arrangements. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| (use visuals of plans and locations as available) | J. Important Geographic Locations.<br>1. Fire Equipment.<br>2. Shelters.<br>3. Critical Facilities.<br><br>K. Communication Methods.<br>1. Telephone.<br>2. Public radio announcements.<br>3. Others.<br><br>L. Station Assignment.<br>1. Telephone number list.<br>2. Reporting procedures.<br><br>(INSTRUCTOR'S NOTE: Methods of alerting or activating "Support Assistant" personnel should be planned locally and should be discussed in some detail at this point.) |
| III. RADIOACTIVE FALLOUT—<br>Time 90 min. | *(INSTRUCTOR'S NOTE: The purpose of this section in the "Support Assistant" B course is to review and update the material taught in the radiological section of "Support Assistant"—Part A. Additional information may be given on fallout distribution, radioactive decay, and shielding. The student should use his "Support Assistant" A Manual as a reference on this subject. If it is possible the instructor should have a guest instructor licensed to use civil defense radiation sources present with a radiation source. There is no substitute for actual exercise with rate meters and dosimeters to give the student an understanding of radiation measurement.)* |
| Section Introduction | A. This lesson deals with.<br>1. Importance of subject matter.<br>2. Review of "Support Assistant"—Part A—Radiation section.<br>3. Fallout distribution, shielding from radiation, and radioactive decay.<br>4. Demonstration of survey meters.<br>5. Actual practice with dosimeters. |
| Importance of Subject Matter | B. The effects of radioactivity from a nuclear attack are misunderstood by many individuals as presenting a fearful, almost hopeless situation, while others tend to ignore it with a fatalistic attitude. If the "Support Assistant" is to be effective in the event of a nuclear attack, he must understand the problems presented by radioactive fallout. He must learn to respect radioactivity, not to fear it. |
| Review of "Support Assistant"—Part A | C. The "Support Assistant" must have an understanding of radiological survey meters and sufficient proficiency in the use of a dosimeter for self confidence and protection. |

| MAIN TOPIC | TEACHING POINTS |
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| (show instruments) | D. The effects of nuclear radiation.<br>1. Symptoms.<br>2. Short-term effects.<br>E. Detection of nuclear radiation.<br>1. Units of measurement.<br>2. Rate meters.<br>3. The dosimeter.<br>F. Dose rates and dose.<br>1. Short-term dose.<br>2. Permissable dose.<br>G. Protective measures.<br>1. Exposure record.<br>2. Limit activity.<br>3. Decontamination. |
| Fallout | H. Distribution depends on.<br>1. Altitude of bomb burst.<br>2. Power and design of bomb.<br>3. Size, shape and density of particles.<br>4. Atmospheric conditions, such as air currents and the direction and velocity of the winds.<br>5. Snow and rain.<br>6. Nature of the ground surface (the deposit of fallout can be compared to the drifting of snow).<br>I. Shielding.<br>Radiation can be attenuated by placing mass, (weight) between the source and the individual. Exact thickness of materials necessary to give a good protection factor cannot be quoted. The density of concrete or earth; the energy of the radiation; the distance from the radiation source to the shielding material, and the distance between the shield and the individual all vary; but between 12 to 18 inches of concrete, or 2 to 3 feet of earth will stop 99 percent of the gamma radiation. This would give a protection factor of 100.<br>J. Decay.<br>1. Radioactivity from fallout decays quite rapidly in the first few hours following the burst.<br>2. 7—10 Rule of Thumb.<br>For every seven fold increase in time, radioactivity drops by a factor of 10:<br>1 hour after bursty activity 100%<br>7 hours after burst activity 10%<br>49 hours after burst activity 1%<br>2 weeks after burst activity .1% |

| MAIN TOPIC | TEACHING POINTS |
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| | This Rule of Thumb holds only when figured from the time of the burst, not from the time of arrival of the fallout in a given area. For example, fallout might be complete in a given area seven hours after the burst and readings taken. These readings would not drop by a factor of 10 in an additional 7 hours it would require 49 hours for the factor of 10 drop in this case. |
| Survey Meters | K. Identify and review types and uses of survey meters.<br>1. CDV 700.<br>2. CDV 715.<br>L. If sufficient CDV 700 meters are available, let the student examine them and take measurements if a radioactive source is available.<br>M. Discuss with the students local Civil Defense plans concerning rate meters.<br>1. Monitoring stations.<br>2. Instruments for emergency services. |
| Dosimeters | N. The Personnel Dosimeter.<br>(NOTE: Let the trainee examine the dosimeter(s) prior to explaining operation.)<br>1. Description and function. Briefly describe and explain how the dosimeter functions. Demonstrate with the model(s) you have. As the firefighter performs his task in a radiation area, nuclear radiation will penetrate his body and the dosimeter he wears. The resulting hairline movement of the dosimeter is a measure of the dosimeter's exposure. So that if a person wears the dosimeter during exposure, it is assumed that his dose is the same as that measured by the dosimeter.<br>2. Types of dosimeters recommended by OCD:<br>a. For training; the CDV–138 measures dosages from 0 to 200 mr.<br>b. For operations.<br>(1) CDV-730, measures dosages from 0 to 20 r. It is used by civil defense workers generally.<br>(2) CDV-740, measures dosages from 0 to 100 r. It is used by emergency service personnel—police, fire, rescue.<br>(3) CDV-742, measures dosages from 0 to 200 r. an operational dosimeter.<br>(4) The CDV-730 and CDV-740 are no longer being procured by OCD. However, they should be used where they have been issued as operational equipment.<br>O. Dosimeter Charger, CDV-750.<br>1. Description and function.<br>a. Show the CDV-750. |

| MAIN TOPIC | TEACHING POINTS |
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| | b. Some method is necessary to charge (zero) dosimeters prior to use.<br>c. That is the purpose of this instrument—to permit us to recharge the dosimeters.<br>d. Here is how we use it.<br>(1) A dosimeter charger is used to place an electrical charge on the indicating mechanism inside the dosimeter. This controls the movement of the hairline. When the hairline is on zero, the dosimeter is "zeroed."<br>(2) The CDV-750 dosimeter charger is used to zero all Civil Defense dosimeters. It has a charging receptacle and downscale-upscale control. The charger is powered by a single 1.5-volt flashlight battery, which operates the charging circuit and provides the light for illuminating the dosimeter scale. There are no internal adjustments to be made on the charger.<br>(3) To charge the dosimeter, remove the dust cover on the charging receptacle, press the dosimeter completely to the bottom of the receptacle and rotate the control knob until the dosimeter reads zero.<br>(NOTE: Allow sufficient time for each student to charge one of each type dosimeter available to become thoroughly familiar with the charging operations. The instructor should check each trainee individually to assure that he knows how to charge a dosimeter. Refer to the instruction manual for directions on how to operate pulse-type chargers, if the transistorized models are not available.)<br>(4) All Civil Defense dosimeters are read by holding them about one-half inch from the eye and pointing them toward any light source sufficient to see the hairline.<br>(5) If an adequate light source is not available, a dosimeter charger may be used to read the dosimeter. Touch it gently to the charging receptacle until the light turns on. If the dosimeter is pressed down too far, it may contact with the charging circuit and the reading could be changed or lost.<br>(6) A dosimeter need not read exactly zero for it to measure exposure. It is possible to determine the dose for any selected period of time by subtracting the reading at the beginning of the exposure period from the reading at the end of the period. This, if a dosimeter read 20r at the beginning of a mission and 50r at the end, the individual exposure was 30r. A dosimeter should be rezeroed after each use if it reads more than 25% of full scale. |

| MAIN TOPIC | TEACHING POINTS |
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| | 2. Checking the 1.5-volt cell. When installing the battery, observe the polarity markings on the battery compartment.<br><br>P. (INSTRUCTOR'S NOTE: Have trainees take an initial reading on a dosimeter and place it near the radioactive source if one is available.)<br>Advise them of the time that the dosimeters will be exposed and the distance they should be placed from the source to obtain good reading in that time or let the student estimate the necessary distance from the reading taken earlier with the CDV-700. Continue with the lesson while the dosimeters are exposed.<br><br>Q. Exposure records.<br>1. Exposure records on individuals may be kept by personnel assigned by the shelter manager for this purpose.<br>2. It will be desirable and in some cases a necessity for the individual to keep his own total dose record.<br>3. The individual should be responsible for keeping his own exposure record for each mission.<br>4. For each mission he should record:<br>a. Name—date.<br>b. Time of day, dosimeter serial number, where he went on mission, and duration of mission.<br>These items under b. are important if it is suspected that a dosimeter is not recording properly. They enable a check to be made on the probable accuracy of a particular dosimeter.<br>c. Initial reading, final reading, mission dose.<br>d. Have students pick up the exposed dosimeters, take the final reading, and figure the dose.<br><br>R. Availability of dosimeters.<br>1. Source.<br>2. Number.<br><br>*(INSTRUCTOR'S NOTE: There might not be enough dosimeters available at all locations for each individual of a group on an emergency mission. Discuss how this might be handled and what extra precautions would need to be taken.)* |
| IV. SESSION REVIEW | A. Emergency Procures for "Support Assistants."<br>B. Fallout.<br>C. Exposure records.<br>D. Distribute "Support Assistant" Part B Manuals.<br>E. Announce next session. |

## LESSON PLAN NO. 2

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—PART B
Section I—Fire Behavior.
Section II—Ventilation.

TIME: 3 hours

OBJECTIVE:

Section I—Fire Behavior: To give the student an understanding of the principles of combustion and how fires start and spread.

INSTRUCTIONAL AIDS:

Overhead, opaque or slide projector.
Selected visuals.
Chalkboard, chalk, and eraser.
Demonstration materials as available.

SELECTED REFERENCES:

a. Local and state fire training manuals as available.
International Fire Service Training Association manuals as available.
b. Student Manual—*Firefighting for Civil Defense Emergency*—Part A "Support Assistant" (student manual).

SUGGESTED FILMS:

Short version of "Design for Disaster."
Los Angeles Fire Department film "Ventilation."

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| SESSION INSTRUCTION—25 min. | *(INSTRUCTOR'S NOTE: Hold a class discussion to review the previous session. The following questions may be used to stimulate the discussion.)*<br>A. Review of previous session.<br>1. Why is the fallout shelter program important?<br>2. How would the public be warned of a nuclear attack?<br>3. Why are communications important in emergency operations?<br>4. What might be some of the duties of a "Support Assistant" following a nuclear attack?<br>5. Where are some of the shelters located in the local area?<br>6. Would the radiation level from fallout be the same at all locations in a city?<br>7. How fast does radiation from fallout decay?<br>8. Would everyone in a group of five men on a mission together need a dosimeter? |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | 9. How can radiation detection instruments be compared to the speedometer and odometer on a car?<br>10. What questions would arise if a "Support Assistant" returns from a mission and finds his dosimeter has gone off scale? How might some of these questions be resolved? |
| | B. This session will deal with:<br>1. Review of previous session.<br>2. Fire behavior.<br>3. Ventilation. |
| I. FIRE BEHAVIOR—60 min. | |
| Section Introduction | A. This lesson deals with the following:<br>1. Importance of subject matter.<br>2. Fire components.<br>3. Fire buildup.<br>4. Fire spread. |
| Importance of Subject Matter | B. The trainee needs a good understanding of the various phases a fire goes through from ignition to full involvement of a building or several buildings. He needs to understand the factors that contribute to the spread of fire build-up in order to evaluate his chances of controlling a given fire and avoid being trapped. |
| Fire Components | C. Fire triangle.<br>1. Solidly connected. (Explosion) |
| (demonstrate) | 2. Weak connections—Illustrate the tenuous nature of fire using kitchen (wood) matches. |
| | D. Review products of combustion from "Support Assistant"—Part A.<br>1. Fuel.<br>a. Carbon.<br>b. Oxygen.<br>2. Products.<br>a. Water.<br>b. CO.<br>c. $CO^2$. |
| (demonstrate) | E. Oxygen.<br>Perform experiment suggested in Figure 2 in "Support Assistant" B student manual. |
| II. VENTILATION—60 min. | To impress the trainees with the importance of prompt and proper ventilation in fire fighting, and show how ventilation can be accomplished at fires in buildings, ships, and other enclosures. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| Section Introduction | A. This lesson deals with:<br>1. Importance of subject matter.<br>2. The what, why, when, where(s) of ventilation.<br>3. Some how(s) and precautions in ventilating. |
| Importance of Subject Matter | B. Most fires and all incipient fires are quite easily extinguished if the base or seat of the fire can be seen and approached. Ventilation is necessary in many fires to make this possible. |
| What | C. What is ventilation?<br>Ventilation as applied to firefighting means the planned, systematic removal of heat, smoke and gases from a structure. |
| Why | D. Why is it done?<br>Because it:<br>1. Aids lifesaving:<br>a. Aids trapped and unconscious occupants.<br>b. Expedites search.<br>c. Conditions safer for firemen.<br>2. Aids attack by enabling firemen to:<br>a. Locate fire quicker.<br>b. Determine path of travel.<br>c. Reduce water damage.<br>d. Expedite salvage operations.<br>3. Reduces the danger of "Back Draft."<br>a. Explain stages of burning.<br>b. Explain characteristics of CO.<br>c. Emphasize venting above fire first.<br>4. Controls spread of fire.<br>a. Draws fire to a desired point.<br>b. Avoid drawing fire through uninvolved parts of structure.<br>5. Reduces accumulation of heat and smoke at upper levels.<br>a. Explain "mushrooming."<br>b. Life hazard on top floor.<br>c. Extension of fire to top floor or attic. |
| When | E. When should ventilation be performed?<br>At fires in buildings, ships, or other enclosures where smoke, heat or gases are present.<br>F. When should ventilation start?<br>1. When water is up to the nozzle and not before.<br>2. When exposures are covered. EXCEPTION: To save a life, by opening at top of stairwell to prevent mushrooming. |
| Where | G. Where to ventilate?<br>1. At roof.<br>a. Open skylights. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | b. Remove scuttle cover.<br>c. Open elevator penthouse.<br>d. Light wells.<br>e. Cut hole in roof—if necessary.<br>2. At windows.<br>a. Open ⅔ from top, ⅓ from bottom.<br>b. Cross ventilation—open from top on leeward side, open from bottom on windward side.<br>c. Explain different types of windows and how to operate.<br>d. Remove curtains, drapes, etc.<br>e. Windows that cannot be opened must be broken—Explain how.<br>f. When to break glass.<br>3. At doorways. |
| Basement Fires | H. Ventilation at basement fires.<br>1. Use vertical shafts where ever possible.<br>2. Open doors and windows.<br>3. Remove dead lights.<br>4. Open coal and delivery chutes.<br>5. Remove store front lower panels.<br>6. Cut hole in floor near a window.<br>7. Push down hot air register. |
| Ventilation of Entire Building | I. Ventilation of entire building.<br>1. Start at top and work downward, floor by floor.<br>2. Open at roof—if necessary.<br>3. Open doors and windows.<br>4. Do not open below men working above. |
| Ship Fires | J. Ventilation at ship fires.<br>1. Trimming ventilators—turn away from wind.<br>2. Removing hatch covers.<br>3. Additional hatch covers tweendeck level.<br>4. Skylights over engine rooms. |
| Mechanical Ventilation | K. Mechanical ventilation.<br>1. Smoke ejector.<br>a. 5000 to 15,000 cu. ft/min. capacity.<br>b. Not to be used in place of conventional ventilation, but as a supplement to same.<br>c. Care must be taken in placement not to spread fire.<br>2. Fog nozzle.<br>a. 10,000-30,000 cu. ft/min. capacity.<br>b. Best results are obtained:<br>(1) held inside of window. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | (2) widest fog angle.<br>(3) largest flow.<br>(taken inside and aimed out) |
| Precautions | L. Precautions.<br>1. Hose streams directed into doorways, windows, skylights, or other openings nullifying ventilation. Could injure men working within by driving heat and smoke at them.<br>2. Openings should not be made in a way to jeopardize nearby structures.<br>3. Holes cut out in floors should be near a window.<br>4. Not desirable to cut holes in path of travel. Firemen may step into these openings.<br>5. Whenever a hole is cut in a roof or floor, skylight, or scuttle cover removed, opening should be probed with tool to find if there are any obstructions.<br>6. When breaking windows care should be taken to make sure no one will be struck by falling glass. |
| REVIEW—15 min. | M. Lesson review.<br>1. Fire behavior.<br>2. Flash over.<br>3. Back draft.<br>4. Ventilation.<br>5. Announce next session. |

## LESSON PLAN NO. 3

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—PART B

Section I—Forceable Entry.

Section II—Ropes and Knots.

Section III—Portable Extinguishers.

TIME: 3 hours.

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OBJECTIVES:

1. To give trainees a knowledge of forcible entry techniques and practices to gain access to the interior of locked structures for fire control or rescue purposes.

2. To teach trainees what knots are used, some proficiency in tying knots, how to judge the condition of rope and how to care for rope.

3. To increase the trainees' understanding of portable extinguishers and develop some ability to use the various types.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk and eraser.

Overhead, opaque or slide projector.

Forcible entry:

One or more, ax, claw-tool, Halligan tool, huxbar, Kelly tool, etc., as available.

Locations, examples, overhead transparencies, or slides, of doors, windows, locks, etc., as available.

Ropes:

One or more Fire Department regulation ropes: one ten foot length of rope for each trainee.

Extinguisher:

As many types of portable extinguishers as are available.

Location and fuel for Class A and B fires for student practice.

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SELECTED REFERENCES:

a. Instructor's:
   Local and State Fire Training manuals as available.
   International Fire Service Training Association manuals as available.
   N.F.P.A. Pamphlet 10 and 10A.

b. Student's: "Support Assistant" Part B manual. *Firefighting for Civil Defense Emergency*—Part B.

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SUGGESTED FILMS:

"Portable Extinguishers," Fire Service Extension, Iowa State University. Other films related to the subject matter as available.

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| MAIN TOPIC | TEACHING POINTS |
|---|---|
| I. SESSION INTRODUCTION—20 min. | A. Review.<br>(INSTRUCTOR'S NOTE: Hold class discussion to review previous class session: The following questions may be used to stimulate the discussion.)<br>1. Can ordinary combustion take place without oxygen?<br>2. What is the importance of the "flash point" of a fuel to a fire fighter?<br>3. What are the two best means a fire has to spread its heat to involve more fuel?<br>4. What is "flash-over?"<br>5. What is a "back-draft?"<br>6. Why do we sometimes have to ventilate fire buildings?<br>7. When is ventilation performed?<br>8. Where do we usually ventilate first? Top or bottom?<br>9. What are some of the precautions to take in ventilating?<br>10. Will hose streams or individuals standing in doorways interfere with ventilation? How? |
| | B. This session deals with:<br>1. Forcible entry.<br>2. Ropes and knots.<br>3. Portable extinguishers. |
| Importance of Subject Matter | C. Good fire departments force entry quickly, with little damage. Poor fire departments take a long time to force entry and do a sloppy job. |
| Types of Tools | D. Types of hand tools.<br>1. Ax<br>a. Types<br>(1) Pike (or pick-head).<br>(2) Flat-head.<br>b. Sizes<br>Usually 4 pound or 6 pound head.<br>c. Uses—will be covered as they occur in subsequent classes on forcible entry, ventilation, overhauling. |
| (demonstrate) | d. Correct and safe methods of carrying the ax.<br>e. Care<br>(1) Keep free of rust (use emery cloth, then coat slightly with oil).<br>(2) Keep sharp—use file or whet-stone, don't use emery wheel, it removes temper.<br>(3) Handles should not be painted.<br>(a) Paint covers cracks and defects.<br>(b) Paint may cause blister on user's hands.<br>(c) Handles should be cleaned with wet sand and canvas. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | 2. Hook (or pike pole).<br>a. Types—generally all the same—some have metal handles, some have wood—there are some patented hooks that differ.<br>b. Sizes referred to by length of handle in feet (6′, 8′, etc.)<br>c. Uses—will be covered later under ventilation, forcible entry, overhauling, etc.<br><br>INSTRUCTOR'S NOTE: *Emphasize strongly* the need for *6 foot* handles. Most small departments have no handles less than 10 feet which is far too long for normal use inside a building—especially a residence. The most common use is pulling ceilings—a 6 foot handle is ideal for this.<br><br>3. Claw-tool.<br>a. A metal bar about 30 inches long with a curved hook, with fulcrum knob at one end and a fork at other end.<br>b. An excellent all-purpose tool for forcing doors and windows, padlocks, etc.; for opening walls and floors, and for many other purposes.<br>c. Requires no care other than to be kept free of rust.<br>4. Kelly tool—(also called door opener or lock breaker).<br>a. A bar about 30 inches long with an "adz" head at one end and tapered blade at other end.<br>b. Used principally for door forcing—especially the "adz" head on doors that open outward.<br>5. Halligan tool.<br>a. A combination of the features of both claw and Kelly tools—has adz head, hook, and claw or fork.<br>b. Uses—many uses—will do all the claw and Kelly tools can do.<br>6. There are several other types of door forcers and overhauling tools, but the above mentioned are the common types—if you have others, discuss them. |
| Entry Points and Principles | E. Points of Entry.<br>1. Doors—entry is commonly made thru doors.<br>2. Windows—sometimes entry by window is necessary or desirable.<br>3. Walls—usually the last resort since entry is difficult, takes time, and causes great damage.<br><br>F. Factors in Entry.<br>1. Type and construction of doors or windows.<br>2. Location and extent of fire.<br>3. Purpose of the entry.<br><br>G. "Life" Principle.<br>1. When human life is endangered, the fastest means of forcible entry *must be* employed, *regardless of property damage.*<br>2. Same applies when urgent to enter quickly for other reasons. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | H. "Property" Principle.<br>1. Entry is forced with as little damage as possible when human life is not a factor or immediate entry not urgent.<br>2. Breaking thru window or door glass.<br>a. Since replacement of glass is inexpensive, it may be broken without hesitation rather than damaging window or door frames.<br>b. Caution is advised in breaking certain types since value may be greater than window or door frame.<br>Examples:<br>(1) leaded glass.<br>(2) insulating glass.<br>(3) tempered glass.<br>WHAT IS FIRST STEP?<br>Always try doors or windows to see if locked or not. |
| Opening Doors<br>(demonstrate and explain each step) | I. Hinged doors that swing out (with pick head, ax, or entry tool).<br>1. Force blade of ax or entry tool between door and jamb just above or below locking device.<br>a. The crosshead (explain).<br>b. The adz blade (explain).<br>c. These are preferable.<br>2. Drive head in to get good "bite" (see figure 1). |
| (have students open door under supervision of instructor or simulate same) | 3. With one hand on pick of ax or on entry tool handle and other hand near end of handle, apply force and pry handle to one side away from door and thus spring door and jamb apart to let lock slip past catch. |
| (demonstrate using entry tool) | J. Hinged doors that swing out (removing hinge pins).<br>1. Force blade of ax or entry tool under hinge pin head.<br>2. Pry up head by pressing down on ax or entry tool.<br>3. Remove pins from all hinges.<br>4. Pry out door with blade of ax or entry tool. |
| (have students remove pins under supervision of instructor) | K. Hinged doors that swing out (removing door hinges).<br>1. Drive ax or entry tool between hinge and door cutting or forcing out screws. It may be necessary to strike tool used as wedge with another tool to force hinge free).<br>2. Repeat on remaining hinges and pry door free. |
| Hinged Doors | L. Hinged door that swings in (stopped frame) Figure 2.<br>1. Force blade between stop strip and jamb and pry away.<br>2. Drive tool past strip between door and jamb.<br>3. Apply force against tool forcing door away from jamb.<br>4. Locking device is released and door is pushed in. |
| | M. Hinged double doors that swing in or out. |

| MAIN TOPIC | TEACHING POINTS |
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| | 1. Remove any weathershrip attached to one of doors which covers crack between the doors, with blade of ax or entry tool.<br>2. Wedge blade of ax or entry tool between doors and pry them apart. |
| Sliding Doors | N. Sliding doors (single).<br>The quickest way to open this type is to remove a panel of the door so that a man can get inside to release fastenings. |
| | O. Sliding doors (double).<br>1. Remove weatherstrip.<br>2. Drive blade of ax or entry tool in just below fastening and pry apart. |
| Vertical Opening Doors | P. Vertical opening doors.<br>1. Vertical opening doors that are locked at the threshold may be opened by forcing blade of ax or tool under door at lock and either raising or pressing on handle to force lock out of threshold.<br>2. Doors locked at side may require removal of panel or glass near lock mechanism to permit access to mechanism.<br>3. Electrically operated vertical opening doors require one or more panels to be removed so man can enter building to operate motor switch. This door will completely jamb if forced. |
| Rabbeted Frames | Q. Hinged door that swings in (rabbeted frame).<br>1. Insert blade of tool between door and frame, drive in.<br>2. Drive in to force tool between door and jamb.<br>3. Apply force to tool forcing door away from jamb, releasing locking devices.<br>4. Push door in. |
| | R. Hinged door that swings in (using Detroit or similar door opener). (Give this only if they have such a tool.)<br>1. This method is becoming obsolete.<br>2. Lay handle flat on ground or floor after fulcrum point has been set from 6 inches to 10 inches from the door.<br>3. Withdraw center rod until compression piece rests under lock.<br>4. Lock center rod in position with lock pin.<br>5. Lift on handle until door gives. |
| Padlocked Doors | S. Padlocked doors (using claw or similar tool).<br>1. Slip hook in bow of lock (figure 3).<br>2. Apply pressure to handle and spring lock open.<br>3. If lock staple will not admit hook, it may be placed in hasp staple and complete assembly torn off.<br>4. Fork end of tool may be placed over bow of lock (figure 4).<br>5. Tool is then turned in circle. Parallel door. |

| MAIN TOPIC | TEACHING POINTS |
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| | 6. Somewhere along the circle, lock will open or hasp will pull out.<br>7. Latter method is especially good on gates where there is no backing such as door frame to place fulcrum against for prying. |
| Forcing a Door | T. Using ladder to force door.<br>1. Place heel of ladder against door sash.<br>2. One beam above lock, one under, rungs vertical.<br>3. Men space out along ladder.<br>4. Apply steady push—*Don't Ram.* |
| Tempered Glass | U. Tempered Glass Doors.<br>1. They can be forced.<br>2. Lock is a pin that fits in socket in sill.<br>3. Put fork end of one tool under door at lock side.<br>4. Put another under at hinge side.<br>5. Pry together to raise door.<br>6. Force in with ladder or claw tool (if door opens in).<br>7. Force out with halligan or kelly tool (if door opens out).<br>8. In some cases bronze lock pin can be cut with ax blade.<br>9. In some cases "horn" on halligan tool can drive out lock mechanism. |
| Opening Windows<br>(if this type of window is in the room, demonstrate the method of forcing entry. *Do not* damage the window limit demonstration to the steps and actions) | V. Opening double hung windows.<br>*EMPHASIZE*<br>In opening all windows having small panes of glass it is more practical to break out a pane near the lock. Clean all glass from pane frame; reach in and unlock window manually.<br>1. Force blade of ax or tool between lower sill and frame in line with lock.<br>2. Apply leverage to force window, thus breaking lock. |
| | W. Opening casement windows.<br>1. Modern casement windows are securely locked.<br>2. Pane near the lock should be removed.<br>3. Reach inside and hand operate machanism. |
| | X. Opening wired glass windows.<br>1. Wire glass should be removed from the sash.<br>2. Cut glass with ax blade down each side of frame allowing glass to fold out or in. |
| | Y. Opening windows from above.<br>1. Reach down with pike.<br>2. Force upper sash down with point end of pole. |
| Breaching Walls | Z. Breathing Brick Walls.<br>1. Remove first brick by means of pick-ax, sledge-hammer, or other such tool.<br>2. Two men on either side of ram grasp handles so that forked |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| | end is toward building. Do not grasp handles next to forked end as they are for protection of the hands.<br>3. Swing ram back together at arms length then swing toward wall quickly.<br>4. Just before point reaches building, it should be raised so as to give a lifting motion to the point as it strikes.<br>5. Repeat operation until hole is of desired size. |
| II. ROPES AND KNOTS—30 min.<br>Importance of Subject Matter | A. When and why rope is used in fire service.<br>Ropes are used in many ways in fire service. Knots must be tied quickly and securely. Often times the fire fighter's life or that of the person being rescued will depend on the security of the knot. |
| | B. Characteristics of ropes.<br>1. Diameters and lengths.<br>2. Materials rope is made of.<br>3. Strength. |
| Care | C. Care of rope.<br>1. Drying.<br>2. Inspection.<br>a. External.<br>b. Internal. |
| Tying Knots (demonstrate and have trainees tie each knot)<br>Measuring Rope<br>Hitches | D. Knots, hitches and bends.<br>1. Measuring the rope (3 foot lengths, from nose to hand).<br>2. Bight.<br>3. Half-hitch.<br>4. Clove-hitch.<br>a. Actually two half-hitches.<br>b. Uses.<br>(1) To make fast to an object.<br>(2) To hold or hoist hose.<br>(3) Stretcher lashings.<br>c. May be used at any part of rope.<br>d. Easily untied.<br>e. Safety binder knot may be desirable also. |
| Bowline | 5. Bowline.<br>a. Never slips.<br>b. Uses.<br>(1) Loop in end of rope.<br>(2) Tying a lifeline.<br>c. Easily untied. |
| Becket Bend | 6. Sheet-bend (becket bend).<br>a. Used for tying two opes together (especially those of different diameters). |

| MAIN TOPIC | TEACHING POINTS |
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| | b. Will not slip.<br>c. More secure than square knot.<br>d. Secure when wet.<br>e. Easily untied.<br><br>(INSTRUCTOR'S NOTE: Use student manual ("Support Assistant" Part B) for reference. Also advise students to practice at home and refer to the student manual when doing so.) |
| III. OPERATING CHARACTERISTICS OF PORTABLE EXTINGUISHERS —60 min. | *(INSTRUCTOR'S NOTE: This section should be mainly a working session to develop the students skill in handling portable extinguishers.*<br><br>The amount of time devoted to actual extinguishment of fire by the students will depend on available facilities and to some extent the amount of time devoted to this practice in the "Support Assistant" Part A class). |
| Section Introduction | This class will deal with:<br>1. Review of portable extinguishers from "Support Assistant" Part A.<br>2. Operating characteristics of individual extinguishers.<br>3. Actual practice with extinguishers. |
| "Support Assistant" Part A Review | A. Classification of Fires.<br>1. A.<br>2. B.<br>3. C.<br>4. D. |
| | B. Extinguishing Agents.<br>1. Water base.<br>2. Inert gas.<br>3. Dry powders. |
| | C. Means of Expulsion.<br>1. Chemical reaction.<br>2. Stored pressure.<br>3. Cartridge operated.<br>4. Hand pump. |
| | D. Underwriters listings. |
| Operating Characteristics | E. Chemical Reaction Type.<br>1. Soda acid.<br>2. Foam. |
| | F. Stored Pressure.<br>1. Pressurized water.<br>2. Loaded stream. |

| MAIN TOPIC | TEACHING POINTS |
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| | 3. Carbon dioxide.<br>4. Dry powders.<br>5. a. B-C dry chemicals.<br>b. ABC dry chemicals.<br>G. Cartridge operated.<br>1. Water.<br>2. Dry powders.<br>a. B-C dry chemicals.<br>b. ABC dry chemicals.<br>H. Water pump tanks |
| Practice Session | Take group outside for actual practice.<br>I. Stress.<br>1. Proper methods of carrying and putting into operation.<br>2. Calm deliberate actions.<br>3. Proper direction of extinguishing agent.<br>4. Conservation of extinguishing agent.<br>5. Careful overhaul of fires. |
| Review | J. Bring group inside for a critique of the practice. |
| SESSION SUMMARY—<br>10 min. | A. Review of session.<br>1. Forcible entry.<br>2. Ropes and knots.<br>3. Extinguishers.<br>B. Time and place for next session. |

## LESSON PLAN NO. 4

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—PART B. Fire Hose and Its Use

TIME: 3 hours

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OBJECTIVES:

To give trainees an understanding of the care and use of fire hose and related equipment, and to develop some proficiency in the handling of hose.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk, eraser
Hose, nozzles, fittings, appliances, and pumping engine
NOTE: This is a working session. Trainees should handle and work with hose and appliances.

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SELECTED REFERENCES:

a. Instructor:
Local Drill Manual.
State Training Manuals as available.
International Fire Service Training Manuals as available.

b. Student Manual—*Firefighting for Civil Defense Emergency*—Part B.

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SUGGESTED FILMS:

Selected training films appropriate to subject matter as available.

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| MAIN TOPIC | TEACHING POINTS |
|---|---|
| Review of Previous Session | A. Review of previous session.<br>(INSTRUCTOR'S NOTE: Have some of the tools used in the previous session available. Have trainees identify them and give some of their uses.)<br>1. Forcible entry.<br><br>3. Portable extinguishers. |
| Importance of Subject Matter | B. Hose is the life line of most fire control efforts. Water must be delivered to the seat of the fire. Any delay in laying or coupling hose means delay in fire control. A hose that bursts during an attack can be a matter of life or death to the men on the nozzle. |
| Hose Sizes and Construction | C. Hose characteristics.<br>1. Sizes (inside diameter).<br>a. booster (¾"-1"). |

| MAIN TOPIC | TEACHING POINTS |
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| | b. 1½"). —(most common)<br>c. 2½").<br>d. 3" (used by many departments).<br>e. (also 3½" and 4" used by some departments) 2" is available also—but few departments use it).<br>f. 50′ lengths are standard, but 100′ lengths are available. |
| | 2. Construction.<br>a. lining—rubber.<br>b. jacket.<br>(1) cotton.<br>(2) cotton and polyester.<br>(3) all polyester.<br>Synthetic hose is lighter in weight, needs less space, folds easier, and does not mildew.<br>c. single jacket—for industrial use.<br>d. double jacket—for fire department use (outer jacket does not add strength, but protects inner jacket from wear).<br>e. unlined linen hose—for forest service and building standpipes. Not for fire departments! Too porous (leaks until fibers swell), too weak, hard to care for and won't last long if used.<br>f. hose should be at least Underwriter's approved.<br>(1) 400 psi, or 600 psi, pressure test for twist and elongation under pressure. |
| (show examples) | 3. Couplings (also called "butts").<br>a. screw thread—one male—one female on each length.<br>b. national standard (and others).<br>c. lugs.<br>(1) rocker.<br>(2) pin.<br>d. gaskets and washers.<br>e. point out that male couplings always point toward nozzle or direction of flow—female toward pump. |
| Care | 4. Care of hose and couplings.<br>a. causes of damage—(show sample of damaged hose).<br>(1) oil, gasoline, grease dissolve rubber.<br>(2) mildew causes cotton to rot.<br>(3) acid burns cotton.<br>(4) heat affects rubber—weakens it.<br>(5) driving over hose injures it.<br>(6) dragging hose over rough surface causes abrasions or cuts of jacket.<br>(7) sudden closing of nozzle may cause water hammer to burst hose.<br>(8) dropping couplings may knock them out of round or injure threads. |

| MAIN TOPIC | TEACHING POINTS |
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| | b. Hose should be:<br>(1) brushed clean or washed clean after use.<br>(2) properly dried<br>(a) in dryer.<br>(b) in tower.<br>(c) on rack.<br>c. do not oil or grease couplings. Powdered graphite may be used. Stuck couplings may be freed by soapy water.<br>d. check gaskets when coupling and placing hose on trucks.<br>e. *hose should be tested at least annually* (give test pressure).<br>f. with good care, hose should last many years. |
| Hose Fittings<br>(show examples and have trainees handle where practical) | 5. Hose fittings.<br>a. Double male—to connect two female couplings.<br>b. Double female—to connect two male coupling (one side must swivel).<br>c. Reducers—<br>(1) 2½" to 1½".<br>(2) 3" to 2½".<br>(3) 4½" to 2½" (usually double female swivel).<br>d. Adapter—to connect a coupling of one type thread (such as national standard) to a coupling of another type—same diameter.<br>Note: Each engine should carry two of each type fitting (except 3" to 2½" reducer not needed if they don't have 3" hose) (except adapter not needed if they have national standard threads).<br>e. Siamese connection—to connect two or more lines into one—(*not* one into two). Has two or more female inlets and *one male* outlet. Females are equipped with clapper valves (check valves) to keep water from backing out an unused inlet. (There are still some old ones without clappers.) |
| (show examples) | f. "Y" or wye connection—to divide *one* line into two. Has *one female* inlet—*two male* outlets. |
| (use examples as available and let trainees examine) | g. 2-way gate (or gated wye)—a "Y" equipped with gate valve on each outlet—(most common size is 2½" female, 1½" male, but 2½" all around has advantages—what are they)? You can put a reducer on one side for 1½" line and take 2½" off other. (MAKE SURE THEY KNOW A "Y" FROM A SIAMESE, some catalogs don't).<br>h. There are also three and four-way gates (used on hydrants or large diameter hose—3½" or 4").<br>i. Single gate valves—used with distributors, cellar pipes, etc.<br>j. Water thief—one 2½" female to two 1½" male and one 2½" male—(don't try to use all three at once).<br>Note: The above are common fittings. There are others. If they have any others, discuss them. |

| MAIN TOPIC | TEACHING POINTS |
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| Hose Appliances | 6. Hose appliances.<br>a. Hose clamp—to shut off water by clamping hose.<br>(1) level type.<br>(2) screw type.<br>(3) hydraulic type.<br>b. Burst hose jacket—to place over burst in hose and can be used to connect lengths of different threads if other means not available. They come in sizes according to hose diameter.<br>c. Pipe holders—Used to hold nozzle in position when heavy stream (over 1¼" tip) is used. There are many types (Perfection, Eureka, Paradox and several others—don't go into detail).<br>d. Hose roller (sometimes called hose hoist) a wooden roller with metal guides, used to roll hose over edge of roof without chafing. |
| Suction Hose | 7. Suction hose—(hard).<br>a. Sizes—inside diameter.<br>(1) 2½".<br>(2) 3".<br>(3) 4½".<br>(4) 5".<br>(5) 6".<br>b. Lengths—8' up to 20'.<br>c. Construction.<br>(1) rubber lining.<br>(2) rubber jacket.<br>(3) made rigid to prevent collapse (usually by metal rings between lining and jacket) because if it collapsed under vacuum, drafting would not be possible.<br>d. Uses—<br>(1) to draft water.<br>(2) to connect pumper to hydrant.<br><br>8. Hydrant connection—(soft)<br>(sometimes erroneously called "soft suction").<br>a. Comes in all sizes from 2½" to 6" (2½", 3", 3½", 4", 5", and 6").<br>b. Comes in any length (usually 12 ft.).<br>c. Is just the same as double jacket, rubber lined hose.<br><br>9. Uses—<br>a. To connect pumper to hydrant.<br>b. To connect one pumper to another for parallel pumping.<br><br>Note: Most suction sleeves and hydrant connections have female coupling at each end although some have a male on one end. |

| MAIN TOPIC | TEACHING POINTS |
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| Stretches | D. Laying or stretching hose lines.<br>Explain and show how hose should be removed from apparatus.<br>1. Reverse lay (back stretch).<br>2. Straight lay (running stretch).<br>Note: Emphasize that they must pull off sufficient hose to reach all parts of the fire. Better to have too much than too little. How would you estimate amount of hose needed? From front door of building, allow one length for each floor plus one extra. (50 foot lengths)<br>Example—Fire on third floor, three plus one, or four lengths. Why? Because lines may have to be taken to back of building or to floor or floors above fire.<br>3. Hand stretch.<br>Have then. pull off and stretch by hand about ten lengths—one man to each length. Advance dry line to point of operation. Walk rapidly, don't run (leave line laid out). |
| Hose Handling (divide men) | 4. Making and breaking coupling connections.<br>Divide men into pairs. First tell and show, then have each pair practice disconnecting and reconnecting coupling connections. (Spread them out and have a pair at end of each length. Have them make and break connections twice each, or until they get it down pat. Have them switch so that they all handle both male and female). Next, demonstrate and then have them all practice *one* man making and breaking coupling connections. Have each do it twice or until proficient. |
| (Practice use of double male and double female connections. Have every pair use each once.) | 5. Using double male and double female connections. |
| | 6. Rolling hose.<br>Have each pair make a doughnut roll. Have enough men make one man roll to get all hose picked up. |
| | 7. Repack hose on apparatus.<br>Explain, supervise, and correct mistakes as they repack hose into hose bed. Mention why it should not be repacked if wet. Show how to pick up a dry line with truck. |
| SESSION REVIEW | A. Hold a discussion regarding the important points of the lesson.<br>B. Announce next session. |

## LESSON PLAN NO. 5

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—PART B
Ladder Practices

TIME: 3 hours

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OBJECTIVES:

To give trainees an understanding of the care and use of ladders, and develop some proficiency in basic handling, raising, and using ladders.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk, and eraser.
Overhead, opaque or slide projector.
Various types and sizes of ladders as available.
Hose and selected hose appliances.
Regulation fire department rope.

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SELECTED REFERENCES:

a. Instructor's:
Local drill manual.
State training manuals as available.
International Fire Service Training manuals as available.
Instructor's Note: Although most fire departments now have metal ladders, it is important that the "Support Assistants" know something about wood ladders. In a nuclear emergency he may have to use whatever ladders are available to him.

b. Student Manual—*Firefighting for Civil Defense Emergency*—Part B.

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SUGGESTED FILMS:

Selected training films appropriate to the subject matter as available.

| MAIN TOPIC | TEACHING POINTS |
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| Importance of Subject Matter | A. When ladders are needed there is no substitute procedure. They must be raised quickly and safely if people are to be rescued, the building ventilated, and the fire controlled. |
| | B. Review of the previous session can be incorporated into this class by using some hose and appliances in connection with the ladder work. |
| Uses | C. Ladders: Uses and construction<br>1. Uses of ladders: Ladders can be used to gain access to higher or lower levels; to span spaces; to force entry; and as tarpaulin supports. |

| MAIN TOPIC | TEACHING POINTS |
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| Construction | 2. Construction.<br>a. Completely of wood.<br>b. Completely of metal.<br>c. Combination of wood and metal.<br>3. Wood materials.<br>a. Douglas fir or spruce for beams.<br>b. Ash or hickory for rungs.<br>4. Metal materials.<br>a. Aluminum alloys.<br>b. Magnesium alloys.<br>c. Steel alloys. |
| Nomenclature | D. Ladders: Types<br>1. Straight ladder: A ladder of one section (also called "wall ladder").<br>a. *Beam* is the principle structural member in which the rungs are supported (also called "rail").<br>(1) Solid beams use solid material for maximum strength (also called "solid side").<br>(2) Trussed beams used assembled parts for light weight and maximum strength.<br>b. *Rung* is the cross member between the beams (also called "rounds").<br>c. *Butt* is that end of the ladder placed on the ground when raising it (also called "heel" or "foot").<br>d. *Butt plates* are metal reinforcements at the butt end of a wooden ladder (also called "heel plates").<br>e. *Tip* is that end placed against the building or in the air when raised (also called "top").<br>f. *Tie rod* is a metal rod which holds the ladder assembly together and tends to strengthen certain rungs.<br>2. Extension ladder is composed of two or more sections.<br>a. *Bed* is the ground section of an extension ladder.<br>b. *Fly* is that part or parts which may be raised out of the bed.<br>c. *Halyard* is rope used to extend the fly.<br>d. *Pawl* is a lock used to support the fly after it is raised (also called "dog").<br>e. *Guides* are wood or metal strips which guide the fly while it is being raised or lowered.<br>f. *Stops* are wood or metal blocks which prevent the fly from being extended out of the bed.<br>g. *Bangor ladder* is an extension ladder.<br>h. *Tormentors* are poles used in handling Bangor ladders.<br>3. Roof ladder is a straight ladder with hooks for securing over the peak of a roof.<br>4. Attic ladder is a folding ladder used for ease in interior operations. |

| MAIN TOPIC | TEACHING POINTS |
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| | 5. An aerial ladder is one that is permanently mounted on a ladder truck and raised or lowered mechanically.<br>6. Pompier or scaling ladder is a single beam ladder, with a large "goose-neck" hook at top.<br>They vary in length from 10′ to 14′—used to scale outside of building from floor to floor by putting hook in window above, usually to get where other ladders are not available. |
| Inspection | E. Inspection of ladders.<br>1. Wood.<br>a. Should be done after each time used and at least once a month.<br>b. Examine rungs for:<br>(1) Looseness.<br>(2) Cracks.<br>(3) Splinters.<br>(4) Rot.<br>(5) Wear.<br>(6) Other weakness.<br>(7) Need for varnish.<br>c. Inspect beams for same and also for warping.<br>2. Metal.<br>a. Should be done after each time used and at least once a month.<br>b. Examine rungs and beams for:<br>(1) Looseness.<br>(2) Weakness at welds.<br>(3) Deformity.<br>(4) Rainbow hued discoloration which indicates ladder may have been weakened by heat.<br>3. Both wood ladders and metal extension ladders.<br>a. Check halyards for weakness, wear, rot.<br>b. Check pawls, guides and stops. |
| Care | F. Care of ladders.<br>1. Wood.<br>a. When dirty, wash with plain cold water.<br>b. Scrape and varnish when needed.<br>c. Handle carefully—don't drop!<br>2. Metal.<br>a. When dirty, wash with plain water.<br>b. Lubricate.<br>c. Don't raise on one beam only (beam raise).<br>d. Handle carefully—don't drop!<br>e. Don't expose to flame—metal loses strength quickly when heated. |

| MAIN TOPIC | TEACHING POINTS |
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| Electrical Conductivity | f. All ladders should be tested annually.<br>Note: Question may be raised as to electrical conductivity of metal ladders.<br>*Answer*—If man is completely on ladder, he is like a bird on a wire, current will pass to ground without passing through him. If he has any part of him touching ground, he will get some of current, maybe fatally. If he is on ladder and touches live wire, he may become a conductor between wire and ladder, which could also be fatal. |
| Carries<br>(Have each man take off truck and put back each ladder to become familiar with how ladders are locked on truck and how they may be readily removed.) | G. Carries.<br>1. Removing and replacing ladders.<br>2. Demonstrate and have each man try one-man carry of short ladders.<br>3. Do same as above with two-man carry.<br>4. Three-man carry.<br>5. Four-man carry. |
| Raises | H. Raises.<br>Note: Have them practice raising ladder parallel to building and giving it a half turn to lower in against building. This is most practical for use on sidewalks, in alleys, etc. Have them extend fly section at least a few rungs each time.<br>1. Stress proper angle and placement of ladder tip, also safety need for man to "butt" base of ladder when someone is on it. Have *each* man participate and if time allows, have them switch positions in the following raises:<br>a. One-man raise.<br>b. Two-man raise.<br>c. Three-man raise.<br>d. Four-man or six-man raise, if ladders are big enough to warrant it.<br>Discuss use of tormentor poles if present. Summarize what has been covered so far. Declare five-minute break. |
| Climbing | I. Climbing and using ladders.<br>1. Demonstrate climbing position and leg-lock for working on right side, and working on left. Have each man climb, lock-in and return. Safety belts, if they have them, can be demonstrated and tried.<br>Instructor should feel free to add to this material where feasible, but should make sure to cover these basic items. However, don't get into intricate or advanced maneuvers. The purpose of this class is to develop *basic* skills in ladder practices.<br>Where more than one ladder is available, men can be divided into groups to practice raises and carries, etc., so that several |

| MAIN TOPIC | TEACHING POINTS |
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| (demonstrate local procedures for positioning ladders at windows) | groups are practicing at once. Their own officers can be used to supervise some of these groups.<br>Note: Some men may ask to be excused because of fear of height. Don't force them, but make sure proper officer knows about it.<br>2. Have each man carry a tool of some kind up ladder to learn how to climb using only one hand.<br>3. Have each man or pair of men take roof ladder up, put it in place, and get up on it.<br>4. Have each man take hose line up ladder, (preferably 2½", if available), lock-in, attach hose strap. Correct mistakes. An additional strap in place at base of ladder is desirable.<br>5. If possible, have them practice entering a window from a ladder. This is not frequently practiced and is not always as easy as may be thought.<br>6. Demonstrate how to carry an unconscious person down ladder. Have each practice this. It would be advisable to have a dummy weighing about 100 pounds for this purpose.<br>J. Using hose on ladders.<br>1. Have class do some simple hose evolutions on the ladder.<br>2. Show uses of ropes in connection with ladder work.<br>K. Review of session.<br>L. Announce next class session. |

## LESSON PLAN NO. 6

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—Part B
Section I—Protective Breathing Equipment
Section II—Overhauling After A Fire

OBJECTIVES:

To acquaint trainees with various types and care of breathing equipment, and to give trainees some proficiency in using breathing equipment properly and safely.

INSTRUCTIONAL AIDS:

Chalkboard, chalk and eraser.
Overhead, opaque or slide projector.
Types of breathing equipment as available and used by the local department.
Ax, claw, Halligan or similar tools as available; 6 foot pike pole.

SUGGESTED FILMS:

Training films appropriate to the subject matter as available.

| MAIN TOPIC | TEACHING POINTS |
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| I. REVIEW | A. Review of previous session. Hold as class discussion to review the previous session using appropriate questions to stimulate the discussion. |
| Introduction | B. This class deals with:<br>1. Protective breathing equipment.<br>2. Overhauling after a fire. |
| Importance of Subject Matter | C. There are many tasks in rescue and fire control that simply cannot be done without protective breathing equipment. "Smoke eating" is dangerous and injurious to the health of the individual on a long-term basis. |
| | D. Purpose of breathing equipment.<br>1. Protection against toxic smoke and fumes.<br>2. Allows firemen to work better and stay longer in smoke. |
| Types of Masks | E. Types.<br>1. Filter-Canister.<br>a. Characteristics.<br>(1) Protects by filtering contaminants.<br>(2) Does not provide oxygen.<br>(3) Filter capacity limited (see label).<br>(4 Carbon monoxide may get through a depleted canister. |

| MAIN TOPIC | TEACHING POINTS |
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| | (5) Carbon monoxide can cause canister to get intolerably hot.<br>(6) Certain gases can penetrate filter.<br>b. Care of Canister.<br>(1) Purpose of window indicator.<br>(2) Purpose of seal on bottom.<br>(3) Discarding dented or punctured canisters.<br>(4) Discarding expired canisters.<br>c. Use.<br>(1) Inspect indicator.<br>(2) Remove seal.<br>(3) Put on harness.<br>(4) Put on facepiece, tighten.<br>(5) Test for proper fit.<br>(6) If canister gets very hot, retreat.<br>(7) When smoke is heavy, stay low.<br>(8) Foreign odor, retreat.<br>(9) If air gets too hot, retreat but don't remove facepiece. |
| (demonstrate)<br><br>Oxygen Self-Generating | 2. Oxygen self-generating.<br>a. Characteristics.<br>(1) Canister will manufacture oxygen.<br>(2) Canister can be used only once.<br>(3) Spring wound timer. |
| (demonstrate) | b. Use.<br>(1) Put on harness.<br>(2) Fasten harness.<br>(3) Remove seal from canister.<br>(4) Insert canister.<br>(5) Put on facepiece, tighten.<br>(6) Test for leakage.<br>(7) Inflate.<br>(8) Set timer.<br>(9) How to relieve excess pressure.<br>c. Disposal of Canister. |
| Demand-Type | 3. Air or oxygen-demand type.<br>a. Characteristics.<br>(1) High pressure cylinders.<br>(2) Regulator reduces pressure.<br>(3) Supply varies with demand.<br>(4) Can be used up in less than specified time.<br>(5) Pressure gauge.<br>(6) Alarm device. |
| (demonstrate) | b. Use.<br>(1) Read cylinder gauge.<br>(2) Put on harness. |

| MAIN TOPIC | TEACHING POINTS |
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| | (3) Put on facepiece.<br>(4) Test for leakage.<br>(5) Cylinder valve opened.<br>(6) Yellow knob.<br>(7) Open and close red knob.<br>(8) Read regulator gauge.<br>(9) When ready to use, connect tube.<br>(10) If breathing becomes difficult, open red knob.<br>(11) Read gauge frequently. |
| Rebreather-Type | 4. Oxygen-rebreathing.<br>a. Characteristics.<br>(1) Re-uses oxygen in exhaled breath.<br>(2) Adds fresh oxygen.<br>(3) Removes carbon dioxide.<br>b. Use.<br>(1) Put on harness.<br>(2) Put on facepiece.<br>(3) Test for leakage.<br>(4) Purge nitrogen.<br>(5) Read gauge frequently. |
| Precautions | F. Precautions for all units.<br>1. Don't put on immediately after heavy exertion.<br>2. Keep calm.<br>3. "Buddy" system.<br>4. Life-line.<br>5. Some gases can be absorbed. |
| Trainee Practice | G. Have trainees put on and activate protective breathing equipment as available.<br>H. Use "smoke house" if available and practical.<br>I. Review<br>1. Purposes.<br>2. Limitations.<br>3. Precautions. |
| II. OVERHAULING AFTER A FIRE | To develop an appreciation of the need for proper search for hidden fire, and to develop an understanding of the techniques used in proper search. Many fires become large losses due to rekindle because of poor or insufficient overhauling. Excessive overhauling also causes much damage. |
| Introduction | A. This lesson deals with:<br>1. Importance of subject matter.<br>2. Need for overhauling.<br>3. Procedures for overhauling.<br>4. Precautions in overhauling. |

| MAIN TOPIC | TEACHING POINTS |
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| Importance of Subject Matter | B. Leaving a small fire smouldering can negate the entire fire control operation and can make the Fire Department or the "Support Assistants" look and feel very foolish. |
| What | C. What is overhauling?<br>1. The search for hidden fire to make sure that no sparks or embers remain.<br>2. The extinguishment of remaining fires. |
| Why | D. Necessity for overhauling—fire tends to remain unnoticed in—<br>1. Concealed spaces.<br>2. Behind walls.<br>3. Under floors.<br>4. In cracks.<br>5. In upholstered furniture.<br>6. In mattresses.<br>7. In rugs.<br>8. In clothing.<br>9. In rubbish.<br>10. In paper piles.<br>11. In cloth stocks. |
| Planning | E. When to overhaul.<br>1. When visible fire is extinguished.<br>2. Hasty start usually not necessary.<br><br>F. Planning of overhaul.<br>1. Take time to plan.<br>a. Be careful.<br>b. Be systematic—determine starting and finishing points, assign work, bring tools to scene.<br>c. Be thorough—consider every place where fire could remain or have extended above, below and around the fire.<br>2. Base plan on following:<br>a. Location—using hearing, sight, touch and smell to find hidden fire.<br>b. Intensity of fire—consider conduction of heat to other locations—examine where fire was most intense.<br>c. Construction involved—of what materials, and how constructed—rooms, passages, vertical and horizontal openings, concealed spaces. |
| Procedure | G. Interior overhaul.<br>1. Overhaul of door and window frames—hidden fire probably found here most often—remove casing or trim.<br>2. Overhaul of walls.<br>a. Feel for heat.<br>b. Open where fire was most intense, or at existing openings. |

| MAIN TOPIC | TEACHING POINTS |
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| | c. Easier, more effective, and less damaging to open side walls from inside.<br>3. Overhaul of wall and room above fire—remove baseboard and puncture previously covered plaster.<br>4. Overhaul of floorboards—cut along side the joists.<br><br>H. Exterior overhaul.<br>1. Opening roof.<br>a. Roofboards removed similarly to floor boards—roofing material removed first to expose boards.<br>b. Tin and built-up roofs—cut and peel back.<br>c. Shingle roofs—remove with shovel or spade—pry loose with pick of ax, claw, or similar tool.<br>d. Sky lights, roof hatches, and other roof openings—cut diagonally from each corner, and peel back from corners.<br>2. Opening exterior walls.<br><br>I. Furniture overhaul.<br>Remove to safe place, pull apart burnt materials and examine thoroughly—use "west water" if available, but still pull apart.<br><br>J. Burned clothing overhaul.<br>Separate unburnt clothing, examine thoroughly, submerge burning clothes in water, put valuables found in clothing in a safe place.<br><br>K. Combustible stock overhaul.<br>Separate from unburned, examine thoroughly, wet down or submerge in water basin made of salvage covers.<br><br>L. Lumberyard overhaul.<br>Move all burned lumber.<br><br>M. Coal, hay, rubbish pile overhaul—remove and examine thoroughly.<br><br>N. Automobile overhaul.<br>1. If electrical cause—*disconnect battery*, examine burned wires.<br>2. Burned seat cushions—remove and examine thoroughly.<br>3. Open trunk to check, inspect underside of floor mats, examine underside of auto.<br><br>O. Scraping char and "washing down"—char scraping not necessary, possibility of re-ignition is very remote—"washing down" frequently overdone, use water sparingly. If fire may be in crevices that are difficult to uncover or to examine, direct small stream into them.<br><br>P. Safety precautions.<br>1. Structural stability of building.<br>a. Floors—burned out joists and posts—overloaded floors.<br>b. Walls—burned out supports, cracks, bulging warped steel beams. |

| MAIN TOPIC | TEACHING POINTS |
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| | c. Roofs—burned out rafters, warped steel beams.<br>d. Space between end floor boards and sidewall is danger signal.<br>e. Water loads should be removed from lowest floor first.<br>2. Causes of injuries.<br>a. Falls—stepping into holes, slipping on wet or icy surfaces, tripping over debris.<br>b. Cuts—broken glass, metal.<br>c. Foreign bodies in eyes—charcoal, plaster, etc.—look away from work when pulling down ceiling—don't crowd together.<br>d. Strains from lifting—lift with legs, not back alone.<br>e. Injuries from falling objects—don't work too close together—look before dropping or throwing anything out of upper levels.<br>f. Struck by tools wielded by others—don't work too close together—hold axe short—look around before using a tool.<br>g. Presence of dangerous materials—acids, other chemicals—special care needed in handling because containers may be weakened.<br>h. Combustible dusts—danger of dust explosion during overhauling.<br>3. Officers should supervise, not join in the work.<br>Q. Use of "watch lines."<br>Small crew of men with charged hose line left to guard against rekindle.<br>R. Value of overhaul in public relations.<br>Explain to occupant or owner the need for overhaul—consider occupant's feelings—be neat in overhauling—remove debris.<br>S. *Application*<br>Describe some cases you have personally experienced where overhauling uncovered hidden fire, unusual travel of fire, etc.<br>T. *Test or Check-up.*<br>1. Have student define overhauling as applied to fire service.<br>2. Have student discuss planning of overhaul.<br>3. Have student review some of the methods used in overhaul.<br>4. Have student explain some of the precautions to take while overhauling.<br>5. Have student demonstrate—pulling ceiling, opening wall, etc.<br>6. Correct mistakes and explain why. |
| Session Summary | A. Protective Breathing Equipment.<br>B. Importance of Overhaul.<br>C. Announce next class session. |

## LESSON PLAN NO. 7

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—Part B
Hose Streams And Their Use

TIME: 3 hours

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OBJECTIVES:

To enable trainees to identify all types of nozzles and appliances; and to develop an understanding of the effective use of hose streams and some skills in handling them.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk, and eraser.
Overhead, opaque or slide projector.
Pumper, hose, all types of nozzles used by department.
Pitot tube and gauges.
Hose appliances used by department.

NOTE: This session includes a "wet" drill, water should be used.

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SELECTED REFERENCES:

a. Instructor's:
   Local Drill Manual.
   State Training Manuals, as available.
   International Fire Service Training Association Manuals, as available.
b. Student Manual—*Firefighting for Civil Defense Emergency*—Part B.

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SUGGESTED FILMS:

"The Nozzleman"—Fire Service Extension—Iowa State University.
Other films appropriate to the subject matter as available.

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| MAIN TOPIC | TEACHING POINTS |
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| Introduction | A. Review.<br>1. Remind the trainees that previous sessions have led up to this one, the use of hose streams. They will be practicing some of the skills learned in previous sessions as well as developing new skills.<br>2. Review some of the key points regarding hose handling:<br>a. Care in handling.<br>b. Laying hose.<br>c. Hose rolls.<br>B. This lesson will include:<br>1. The importance of the subject matter. |

| MAIN TOPIC | TEACHING POINTS |
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| | 2. Types of nozzles.<br>3. Tactical considerations.<br>4. Use of hose streams.<br>5. Nozzle handling.<br>6. Fire pumps.<br>7. Pumping and practice in handling lines. |
| Importance of Subject Matter | C. Getting water from the source to the seat of a fire is a chain of practices. A chain is no stronger than its weakest link and the proper use of hose streams is most important in delivering water to the seat of the fire. The improper use of hose streams can negate the other links in the chain. |
| Nozzles | D. Nozzles.<br>1. Two major types:<br>a. Solid stream.<br>b. Fog.<br>2. Sizes.<br>a. Various types to fit every size hose from booster to 3½".<br>b. Solid stream nozzles are referred to by inside the diameter of *tip*—(i.e.—1" nozzle means that it has a tip 1" in diameter not that it fits 1" hose).<br>c. Fog nozzles are referred to by discharge capacity in gallons per minute (i.e.—60 gals., 100 gals., etc.).<br>3. Types of solid stream nozzles.<br>a. Open—(no shut off or control valve).<br>b. Controlling—(also called shut off).<br>c. Underwriters' playpipe—a long open nozzle with no shut off. These were once used by fire departments, but now are found usually only in hose houses at industrial plants where they are still in common use.<br>4. Fog nozzles.<br>a. *Impinging stream*—(also called Navy type) fog head has several small holes drilled at angles so that streams impinge (strike one another) to break into fine spray. It also has a solid stream orifice.<br>Handle forward—closed.<br>Handle straight up—fog.<br>Handle all the way back—solid stream.<br>Fog button (head) may be removed and replaced by an applicator.<br>Applicator is a long tube bent at far end, which has a fog head on it. It is suitable for flammable liquid fires—especially in tanks.<br>Fog is fixed pattern—not adjustable.<br>b. *Periphery jet*—Spray pattern is adjustable from straight |

| MAIN TOPIC | TEACHING POINTS |
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| (show and let trainees handle available nozzle equipment) | stream to wide angle fog, by turning movable head. Older types have no handle—are shut off by turning. Newer types —have shut off handle.<br>c. There are several makes and models differing slightly in operation.<br>d. Shut off handle advantages—<br>(1) Fog pattern may be selected in advance.<br>(2) There is no need to pass through straight stream when opening or closing which may cause unnecessary water damage and increased reaction which could wrest nozzle from control.<br>e. Special features of *some* periphery fog nozzles.<br>(1) Variable flow—gpm may be changed by moving a selector.<br>(2) Constant gallonage—same gpm regardless of fog pattern.<br>(3) Self-cleaning device to remove pebbles or other obstructions without removing nozzle.<br>Note: Students should be impressed that periphery fog nozzles vary considerably in discharge. Two nozzles may look exactly alike yet one may discharge twice as much water as the other (at same pressure).<br>Unless nozzle is constant gallonage type, it will discharge much more water in wide fog than narrow fog or straight stream.<br>5. Pumpers should be equipped with nozzles of sufficient size to fully utilize capacity. A 750 gpm pumper can supply three streams totaling 750 gallons. It should have three nozzles with a total capacity of 750 gallons per minute. A good combination would consist cf two solid stream nozzles with 1⅛" tips (250 gpm fog nozzle; another good combination would be one solid stream 1⅛", one 1¼" (320 gpm) and one 160 gpm fog nozzle.<br>6. Playpipes—A term sometimes used to describe a pipe with handles to which nozzle is attached. Although still popular, it's a hold-over from the old days. There is really no need for it and it adds considerable weight.<br>7. Cellar nozzles.<br>a. Types.<br>(1) Distributors—have retating heads with several orifices to discharge water in coarse spray (several types, Bresnan is most common).<br>(2) Hart cellar pipe—nozzle may be directed up and down and from side to side—from above.<br>(3) Baker—similar to Hart, but has long handle. |

| MAIN TOPIC | TEACHING POINTS |
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| | (4) Bent cellar pipe—a long pipe with two right angles—nozzle on end. (There are several other types.)<br>b. Use—Cellar nozzle is lowered through hole cut in floor above fire—usually from first floor into basement, but can be used elsewhere, as from roof into cockloft, attic, or top floor.<br>8. Deluge "gun" (Deluge set) (or portable "monitor").<br>a. A large nozzle mounted on a portable platform equipped with two or three siamesed inlets.<br>b. May be operated from truck or moved to any suitable location.<br>c. Barrel swivels in a circle and may be raised or lowered.<br>d. Has removable tops of various sizes (1½", 1¼", 1¾", 2").<br>e. May be left unattended, if necessary.<br>f. Recommended for use on large fires when sufficient water supply is available, (300 gpm—up, depending on tip used).<br>g. Usually requires two or three lines depending on tip size and distance from pumper.<br>9. Deck pipe—A deluge or monitor gun permanently mounted on truck or apparatus.<br>10. Ladder pipe—A large pipe similar to deluge gun mounted on an aerial ladder (removable). |
| Tactical Considerations | E. Confining the fire—<br>1. A good fire department will confine 95% of its fires to the room or area involved when the department arrives.<br>2. Remember fire travels upward because heat rises. It may travel upward via:<br>a. Stairways.<br>b. Chutes.<br>c. Light and air shafts.<br>d. Elevator shafts.<br>e. Ducts (heating, ventilating, airconditioning).<br>f. Concealed wall spaces.<br>These vertical arteries should be protected with hose lines when necessary.<br>3. Fire can skip intervening floors and jump to topmost points such as attic, cook-loft, top floor because the rising, heated gases, unable to escape, will build up there until wood, and other combustible materials present, are heated to ignition point.<br>4. Ventilation at the top helps hot gases to escape and reduces chance of mushrooming.<br>5. Remember also that fire may travel by radiation and conduction. Examine all sides of fire area and above and below it.<br>Pay particular attention to ceilings and sidewalls. Open them if there is a chance fire may have spread there. |

| MAIN TOPIC | TEACHING POINTS |
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| | 6. *Have tools handy.*<br>There should be at least:<br>—one man with an axe<br>—one man with a pike pole (*six* foot handle)<br>—one man with a claw (or similar) tool ready to use the tools when needed<br>Don't leave these essential tools behind on the truck. Have them on hand. |
| Nozzle Selection | F. Extinguishing the fire.<br>1. Select the proper size and type of nozzle.<br>2. Select the proper size hose.<br>3. An adequate discharge (gallons per minute) is essential.<br>a. A common mistake is starting attack with a discharge too small.<br>b. The discharge must be sufficient to absorb heat faster than it is being produced.<br>c. It is safer to apply too much rather than too little.<br>d. The amount can be controlled by the length of time the nozzle is open. |
| Use of Hose Streams | 4. Placement of hose streams.<br>a. Streams should be placed to cut-off spread of fire, not to push it through the building.<br>b. Hose streams cause strong air currents which push smoke and heat in direction of stream.<br>c. Hose streams from opposite directions push smoke and heat toward each other, making advance difficult.<br>d. Outside streams (through windows) should never be directed into same floor as men are in or trying to get in. These streams push heat and smoke back into building; firemen inside may get burned.<br>e. The same as (d) occurs when streams are directed through holes in roof.<br>f. *Remember*—in order for water to extinguish fire, it must contact burning material. If it doesn't fire will continue to burn.<br>Nozzle must be brought to where water will hit the burning material and cool it.<br>Putting water on smoke or flame will not extinguish fire. |
| | Note: Instructor can usually give good example at this time by pointing out how a fire in a part of the room that could not be reached by a stream aimed in window would continue to burn no matter how much water was poured through that window.<br>He can then point out how a stream brought in through the doorway could reach the fire. |

| MAIN TOPIC | TEACHING POINTS |
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| Nozzle Handling | 5. Handling the nozzle.<br>a. Nozzle should be advanced to where the fire can be seen before it is opened.<br>b. Nozzle should be opened slowly—sudden release of pressure may wrest it from grasp.<br>c. Nozzle should be aimed at floor until all air is discharged, to keep air from striking fire and accelerating it.<br>d. Nozzle should be aimed to have stream hit ceiling.<br>e. Nozzle should be moved rapidly back and forth, left to right or in a circle, to cover all the fire.<br>f. Nozzle should be closed slowly—rapid closing causes "water hammer" that may burst hose.<br>g. In hot smoky condition, nozzleman, and others, should get down low.<br>h. In hot smoky condition, men on nozzle should be relieved by others after a short spell.<br>6. Advancing the line.<br>a. Men should not "bunch up" near nozzle, but should be spread out along the hose line.<br>b. One man should back up nozzleman to take up the "kick-back" strain.<br>c. Hose line should not be held by others except when being moved—leave it on floor when not moving.<br>d. When nozzle is to be advanced, officer or nozzleman calls "more line" and the men pick up and move line forward.<br>e. As soon as fire is darkened, line should be moved to next point from which fire can be hit.<br>f. Nozzle should be closed as soon as fire is darkened and re-opened only where more fire is seen. |
| Fire Pumps | G. Why pumps are used.<br>1. To give velocity to water to reach fire.<br>2. To pick up water from static source.<br><br>H. Types of pumping apparatus.<br>1. Double combination.<br>2. "Triple".<br>3. "Quad".<br>4. "Quint".<br><br>I. Capacity.<br>1. "GPM".<br>2. Pressure.<br>3. Capacities vary from 500 to 1750 gpm. Try to demonstrate the following using gauges. |
| Friction Loss | J. Friction loss principles.<br>1. Longer the line, the greater the loss. |

| MAIN TOPIC | TEACHING POINTS |
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| | 2. Greater the flow, the greater the loss.<br>3. The smaller the hose diameter, the greater the loss. |
| | K. Friction loss example. |
| Elevation Loss | L. Elevation loss (and gain).<br>1. About ½psi per foot of height.<br>2. Roughly 5 psi per story. |
| | M. Nozzle pressure is proportionate to pump pressure. |
| Actual Practice ("Wet Drill") | N. Hose stream practice.<br>1. Have them lay a 2½" line to point where water can be used from nozzle. Start water; then get second line into operation close to first one.<br>2. Have each man operate each type of nozzle for 2½" hose. Show how to hold and maneuver nozzle and hose. Only one man back-up, not an army.<br>3. Use whatever appliances they have for 2½" hose. Explain purpose of each and how used. |
| Session Review | O. Review of session.<br>1. Importance of fire streams.<br>2. Safety in handling.<br>3. Get water to seat of fire. |
| | P. Announce next class session. |

## LESSON PLAN NO. 8

COURSE TITLE AND NUMBER: Firefighting for Civil Defense Emergency—Part B

Section I—Emergency Water Supplies
Section II—Rescue Under Fire Conditions

TIME: 3 hours

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OBJECTIVES:

Section I—To develop an appreciation of the need and some idea of how emergency water supplies might be obtained.

Section II—To give trainees an understanding of techniques for finding and rescuing persons endangered by fire and give trainees some skill in performing certain drags and carries.

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INSTRUCTIONAL AIDS:

Chalkboard, chalk, and eraser.
Overhead, opaque or slide projector.
Short ladder and regulation rope.
Clean floor or rug to practice drags.

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SELECTED REFERENCES:

a. Instructor:
   State Rescue Training Manuals as available.
   International Fire Service Rescue Training Manual.
b. Student Manual—*Firefighting for Civil Defense Emergency*—Part B
c. Large map of local area.

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SUGGESTED FILMS:

Training films appropriate to subject matter, as available.

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| MAIN TOPIC | TEACHING POINTS |
|---|---|
| I. EMERGENCY WATER SUPPLIES | A. This lesson will include:<br>1. Importance of subject matter.<br>2. Why emergency supplies may be needed.<br>3. Water sources.<br>4. Water transportation.<br>5. Local sources. |
| Importance of Subject Matter | B. Water is the most used and most necessary resource for fire control. Without it the labor of controlling fire becomes very difficult; so difficult that fire departments that respond to rural areas devote a major portion of their effort toward bringing or getting water to the fire. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| Why Emergency Supplies | C. What can happen from air attack?<br>1. Broken dams.<br>2. Burst mains.<br>3. No pumping station power.<br>4. Many broken pipes.<br>5. Example of Nagasaki. |
| What Emergency Supplies | D. What can be used?<br>1. Swimming pools.<br>2. Gravity tanks.<br>3. Industrial water supplies.<br>4. Cisterns.<br>5. Sewers.<br>6. Drafting from mains. |
| Transportation of Water | E. Water transportation.<br>1. Fire department tankers.<br>2. Privately owned vehicles.<br>a. Milk tankers.<br>b. Other tankers.<br>c. Cement mixers.<br>d. Pick-up trucks with cattle tank.<br>3. Portable folding tanks.<br>4. Improvised tanks. |
| Other Tactics | F. Other tactics.<br>1. Overcoming incompatible threads.<br>a. Adapters.<br>b. Cooper hose-jacket.<br>c. Putting hose into suction.<br>2. Emergency storage.<br>a. Temporary dams.<br>(1) Creeks.<br>(2) Storm sewers.<br>b. Plugging basement drains. |
| | G. Local emergency sources.<br>Use large map of local area.<br>Have class discussion of possible sources for emergency water supplies in the area. |
| II. RESCUE UNDER FIRE CONDITIONS<br>Time 1 hour | A. This lesson will include:<br>1. Importance of subject matter.<br>2. Rescue procedures.<br>3. Rescue techniques.<br>4. Actual practice. |
| Importance of Subject Matter | B. The know how of a person attempting a rescue under fire conditions is vital to both the rescuer and the person being rescued. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| Problems | C. Limitations imposed by fire conditions.<br>1. Heavy smoke.<br>a. Toxic.<br>b. Little or no visibility.<br>2. High temperatures. |
| Procedures | D. Stay low.<br>1. Safer from heat.<br>2. Safer from smoke.<br>3. Better visibility. |
| (Note: Explain, demonstrate and have trainees try various drags, carries, and rope rescue methods.) | E. Search.<br>1. For unconscious or trapped victims.<br>2. To make sure everyone has escaped.<br>3. Perform search systematically.<br>4. Don't rely on information of bystanders.<br>5. How to search.<br>a. Crawl on floor.<br>b. Sweep arms out to feel.<br>c. Search under beds and in closets.<br>d. Listen for heavy breathing.<br>e. If victims body locks door, take door off hinges.<br>f. If door chain locked or bolted, someone is inside.<br>F. Removal.<br>1. Ambuatory.<br>2. Unconscious.<br>a. Drags.<br>(1) Head first.<br>(2) Face up.<br>(3) If dragged by one leg, other leg may catch on obstacles.<br>b. Carries.<br>(1) Fireman's carry.<br>(2) Two man seat carry.<br>(3) Chair carry.<br>(4) Fore and aft carry.<br>(5) Three man carry.<br>c. Rope rescue.<br>(1) Single slide.<br>(2) Double slide.<br>(3) Bowline-on-bight on rescuer.<br>(4) Bowline-on-bight on victim.<br>d. Net rescue.<br>(1) How to open net.<br>(2) How to hold net.<br>(3) Moving the net.<br>(4) Removing jumper from net.<br>(5) How to jump. |

| MAIN TOPIC | TEACHING POINTS |
|---|---|
| Course Summary | A. The nuclear fire threat.<br>B. Fallout.<br>C. Shelter.<br>D. The need for "Support Assistants".<br>E. How "Support Assistants" would be used (Under direct control of regular fire forces).<br>F. Announce possible followup steps or courses for "Support Assistants".<br>G. Award "Support Assistants" art B card.<br>Note: Have Civil Defense or Government Official present award cards. |

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